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## Myo-mechanical analysis of isolated skeletal muscle.

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### Public Summary:

To assess the in vivo effects of therapeutic interventions for the treatment of muscle disease, quantitative methods are needed that measure force generation and fatigability in treated muscle. We describe a detailed approach to evaluating myo-mechanical properties in freshly explanted hindlimb muscle from the mouse. We describe the atraumatic harvest of mouse extensor digitorum longus muscle, mounting the muscle in a muscle strip myograph, and the measurement of maximal twitch and tetanic tension, contraction time, and half-relaxation time, using a square pulse stimulator. Using these measurements, we demonstrate the calculation of specific twitch and tetanic tension normalized to muscle cross-sectional area, the twitch-to-tetanic tension ratio, the force-frequency relationship curve and the low frequency fatigue curve. This analysis provides a method for quantitative comparison between therapeutic interventions in mouse models of muscle disease, as well as comparison of the effects of genetic modification on muscle function.

### Scientific Abstract:

To assess the in vivo effects of therapeutic interventions for the treatment of muscle disease, quantitative methods are needed that measure force generation and fatigability in treated muscle. We describe a detailed approach to evaluating myo-mechanical properties in freshly explanted hindlimb muscle from the mouse. We describe the atraumatic harvest of mouse extensor digitorum longus muscle, mounting the muscle in a muscle strip myograph (Model 820MS; Danish Myo Technology), and the measurement of maximal twitch and tetanic tension, contraction time, and half-relaxation time, using a square pulse stimulator (Model S48; Grass Technologies). Using these measurements, we demonstrate the calculation of specific twitch and tetanic tension normalized to muscle cross-sectional area, the twitch-to-tetanic tension ratio, the force-frequency relationship curve and the low frequency fatigue curve. This analysis provides a method for quantitative comparison between therapeutic interventions in mouse models of muscle disease, as well as comparison of the effects of genetic modification on muscle function.

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